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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/541,011

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Ashutosh Joshi

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Kevin D McCarthy  
Roach Brown McCarthy & Gruber  
1620 Liberty Building  
Buffalo, NY 14202

EXAMINER

WONG, EDNA

ART UNIT

PAPER NUMBER

1795

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DELIVERY MODE

08/26/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/541,011	<b>Applicant(s)</b> JOSHI ET AL.	
	<b>Examiner</b> EDNA WONG	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 14 August 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,4-6 and 8-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,4-6 and 8-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on August 14, 2008 has been entered.

This is in response to the Amendment dated August 14, 2008. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office Action.

***Response to Arguments***

Claim Rejections - 35 USC § 112

I. Claims **1-2, 4-6 and 8-18** have been rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The rejection of claims 1-2, 4-6 and 8-18 under 35 U.S.C. 112, first paragraph, has been withdrawn in view of Applicants' amendment.

II. Claims **1-2, 4-6 and 8-18** have been rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The rejection of claims 1-2, 4-6 and 8-18 under 35 U.S.C. 112, second paragraph, has been withdrawn in view of Applicants' amendment.

Claim Rejections - 35 USC § 103

I. Claims **1-2, 4-6 and 8-17** have been rejected under 35 U.S.C. 103(a) as being unpatentable over **CS 274995** ('995) in combination with **Parrish** (US Patent No. 6,793,903 B1).

The rejection of claims 1-2, 4-6 and 8-17 under 35 U.S.C. 103(a) as being unpatentable over CS 274995 ('995) in combination with Parrish has been withdrawn in view of Applicants' amendment.

II. Claim **18** has been rejected under 35 U.S.C. 103(a) as being unpatentable over **CS 274995** ('995) in combination with **Parrish** (US Patent No. 6,793,903 B1) as applied to claims 1-2, 4-6 and 8-17 above, and further in view of **DD 51638** ('638).

The rejection of claim 18 under 35 U.S.C. 103(a) as being unpatentable over CS 274995 ('995) in combination with Parrish as applied to claims 1-2, 4-6 and 8-17 above, and further in view of DD 51638 ('638) has been withdrawn in view of Applicants' amendment.

***Response to Amendment***

***Claim Rejections - 35 USC § 103***

Claims **1, 4-6 and 8-16** are rejected under 35 U.S.C. 103(a) as being unpatentable over **CS 274995** ('995) in combination with **Parrish** (US Patent No. 6,793,903 B1) and **Jen et al.** ("Determination of Hydroxyl Radicals in an Advanced Oxidation Process with Salicylic Acid Trapping and Liquid Chromatography", *J. of Chrom. A*, Vol. 796 (1998), pp. 283-288).

CS '995 teaches a method for enhancing the generation of hydroxyl radicals (OH\*) in aqueous mixtures (= wastewaters or aqueous solutions) [page 3, lines 17-18; and page 4, lines 6-7] containing hydrogen peroxide (= H<sub>2</sub>O<sub>2</sub>) [page 3, lines 23-24], comprising:

(i) supplying oxygen to said mixture (= bubbling air or O<sub>2</sub> through the solution) [page 3, lines 20-21];

(ii) supplying Fe<sup>+2</sup>, Cu<sup>2+</sup> or Ni<sup>+2</sup> to said mixture as a catalyst wherein the catalyst is supplied to the mixture to a concentration of from 2 ppm to 250 ppm (= in the presence of ions of iron, copper or nickel in the form of soluble inorganic salts in catalytic concentrations, i.e., at least 17 mg/liter) [page 3, lines 21-23];

(iii) irradiating said mixture with UV light (= under UV irradiation) [page 3, lines 17-20]; thereby providing a synergic combination of UV, H<sub>2</sub>O<sub>2</sub> and O<sub>2</sub>; and

(iv) mixing said mixture (= active mixing of the solution) [page 3, lines 20-21; page 4, lines 13-15; and page 7, lines 15-16] at ambient temperature (= 25°C and 28°C)

[page 4, lines 17-18; and page 7, lines 16-17].

The oxygen is supplied by injecting air or oxygen into the mixture (= bubbling air or O<sub>2</sub> through the solution) [page 3, lines 20-21].

The UV radiation has wavelength of from 190 to 390 nm (= UV irradiation) [page 3, lines 17-20].

The period lasts from 3 seconds to 5 hours (pages 4-7, Examples 1-10).

The period lasts from 30 second to 100 minutes (pages 6-8, Examples 6-10).

The method of CS '995 differs from the instant invention because CS '995 does not disclose the following:

- a. Wherein the catalyst is magnesium oxide (MgO), as recited in claim 1.
- b. Wherein the MgO is suspended, as recited in claim 1.

CS '995 teaches Fe<sup>+2</sup>, Cu<sup>2+</sup> or Ni<sup>+2</sup> as photocatalysts (page 1, lines 1-4).

Like CS '995, Parrish teaches a method for catalytic degradation. Parrish teaches that the decomposition of hydrogen peroxide occurring on a heated surface **18** which contains a catalytic coating **20**. The catalytic coating is composed of a variety of compound including, but not limited to, Fe(II), Fe(III), Cr(II), Cu(II), Pt black, Ag, Pd or oxides surfaces, such as metal oxides, glass, quartz, Mo glass, Fe<sub>3-x</sub>MN<sub>x</sub>O<sub>4</sub> spinels, Fe<sub>2</sub>O<sub>3</sub> with Cu ferrite, MgO and Al<sub>2</sub>O<sub>3</sub> (col. 3, lines 23-35).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the catalyst described by CS '995 with wherein

the catalyst is magnesium oxide; and wherein the MgO is suspended because substituting the  $\text{Fe}^{+2}$  and  $\text{Cu}^{2+}$  disclosed by CS '995 with MgO would have been functionally equivalent as a catalyst (material) in the decomposition of hydrogen peroxide as taught by Parrish (col. 3, lines 23-35).

It has been held that the selection of a known material based on its suitability for its intended use supports a prima facie obviousness determination (MPEP §§ 2144.06 and 2144.07).

c. Wherein the hydrogen peroxide has an initial concentration of from 2 to 250 ppm, as recited in claim 1.

d. Wherein the initial concentration of hydrogen peroxide is from 10 to 50 ppm, and the initial concentration of magnesium oxide is from 10 to 50 ppm, as recited in claim 8.

CS '995 teaches that  $\text{H}_2\text{O}_2$  is used as an initiator in a concentration corresponding to 10% of the molar concentration of the complexing agents (page 3, line 23 to page 4, line 2).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the hydrogen peroxide described by CS '995 with wherein the hydrogen peroxide has an initial concentration of from 2 to 250 ppm because the initial hydrogen peroxide concentration is a result-effective variable and one skilled in the art has the skill to calculate the initial hydrogen peroxide concentration

that would have determined the success of the desired reaction to occur, i.e., a concentration corresponding to 10% of the molar concentration of the complexing agents (MPEP § 2141.03 and § 2144.05(II)(B)).

Furthermore, the initial hydrogen peroxide concentration would have determined the concentration of the oxidative free radicals formed.

Furthermore, Parrish teaches that high concentrations (over 50%) of hydrogen peroxide in solution are unstable and the rate of decomposition increases by a factor of 2.3 for each 10° C temperature rise (col. 3, line 65 to col. 4, line 9).

Furthermore, it has been held that changes in temperature, concentration or both, is not a patentable modification; however, such changes may impart patentability to a process if the ranges claimed produce new and unexpected results which are different in kind and not merely in degree from results of the prior art, such ranges are termed "critical" ranges and Applicant has the burden of proving such criticality; even though Applicant's modification results in great improvement and utility over the prior art, it may still not be patentable if the modification was within capabilities of one skilled in the art; more particularly, where general conditions of the claim are disclosed in the prior art, it is not inventive to discover optimum or workable ranges by routine experimentation. *In re Aller*, 220 F2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) and MPEP § 2144.05.

As to the initial concentration of magnesium oxide is from 10 to 50 ppm, CS '995 teaches catalytic concentrations of at least 17 mg/liter (page 3, lines 21-23).



e. Wherein the oxygen is supplied to saturation, as recited in claim 5.

The oxygen disclosed by CS '995 is inherently supplied in an amount (pages 4-8, Examples 1-10).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the oxygen described by CS '995 with wherein the oxygen is supplied to saturation because the oxygen supplied is a result-effective variable and one skilled in the art has the skill to calculate the oxygen supplied that would have determined the success of the desired reaction to occur, e.g., decomposing/oxidizing the complexing agents in the wastewaters or aqueous solutions (pages 4-8, Examples 1-10) [MPEP §§ 2141.03 and 2144.05(II)(B)].

Furthermore, it has been held that changes in temperature, concentration or both, is not a patentable modification; however, such changes may impart patentability to a process if the ranges claimed produce new and unexpected results which are different in kind and not merely in degree from results of the prior art, such ranges are termed "critical" ranges and Applicant has the burden of proving such criticality; even though Applicant's modification results in great improvement and utility over the prior art, it may still not be patentable if the modification was within capabilities of one skilled in the art; more particularly, where general conditions of the claim are disclosed in the prior art, it is not inventive to discover optimum or workable ranges by routine experimentation. *In re Aller*, 220 F2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) and MPEP § 2144.05.

f. Wherein the pH of said mixture has a value of from 5 to 10, as recited in claim 9.

g. Wherein said pH has a value of 7.2 to 9.7, as recited in claim 10.

The mixture disclosed by CS '995 inherently has a pH.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the mixture described by CS '995 with wherein the pH of said mixture has a value of from 5 to 10; and wherein said pH has a value of 7.2 to 9.7 because it has been held that changes in temperature, concentration or both, is not a patentable modification; however, such changes may impart patentability to a process if the ranges claimed produce new and unexpected results which are different in kind and not merely in degree from results of the prior art, such ranges are termed "critical" ranges and Applicant has the burden of proving such criticality; even though Applicant's modification results in great improvement and utility over the prior art, it may still not be patentable if the modification was within capabilities of one skilled in the art; more particularly, where general conditions of the claim are disclosed in the prior art, it is not inventive to discover optimum or workable ranges by routine experimentation. *In re Aller*, 220 F2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) and MPEP § 2144.05.

Furthermore, CS '995 teaches a mixture similar to the mixture as presently claimed. Similar compositions can reasonably be expected to inherently have the same properties.

h. Wherein said mixing is carried out for a period of time sufficient to generate the desired amount of radicals, as recited in claim 11.

i. Wherein said desired amount of radicals is an amount sufficient to reach a required biocidal effect in the mixture, as recited in claim 12.

j. Wherein said desired amount of radicals is a predetermined quantity, as recited in claim 16.

CS '995 teaches bubbling air or O<sub>2</sub> through the solution (page 3, lines 20-21). The mixing is carried out for a period of time (pages 48, Examples 1-10).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the mixing described by CS '995 with (h) to (k) above because the Applicant has a different reason for, or advantage resulting from doing what the prior art relied upon has suggested, it is noted that it is well settled that this is not demonstrative of nonobviousness. *In re Kronig* 190 USPQ 425, 428 (CCPA 1976); *In re Linter* 173 USPQ 560 (CCPA 1972); the prior art motivation or advantage may be different than that of Applicants while still supporting a conclusion of obviousness. *In re Wiseman* 201 USPQ 658 (CCPA 1979); *Ex parte Obiaya* 227 USPQ 58 (Bd. of App. 1985) and MPEP § 2144.

k. Wherein said period lasts more than 5 hours, as recited in claim 15.

CS '995 teaches active mixing of the solution (page 3, lines 20-21; page 4, lines 13-15; and page 7, lines 15-16).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the mixing described by CS '995 with said period lasts more than 5 hours because the period is a result-effective variable and one skilled in the art has the skill to calculate the period that would have determined the success of the desired reaction to occur (MPEP § 2141.03 and § 2144.05(II)(B)).

Furthermore, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation (MPEP § 2144.05).

I.       Wherein the generated hydroxyl radicals are quantified by reacting them with salicylic acid, as recited in claim 1.

Jen teaches using liquid chromatography indirectly to detect hydroxyl radicals after a trapping reaction with salicylic acid in an advanced oxidation process (abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method described by CS '995 with wherein the generated hydroxyl radicals are quantified by reacting them with salicylic acid because it is conventional in an advanced oxidation process to trap hydroxyl radicals using salicylic acid as taught by Jen (abstract).

***RE: REMARKS***

Applicants state that photo-oxidation of the complex-forming substances

is due to the photocatalytic activity of the newly, formed complex and not to the photocatalytic action of free metal ions or metal salts in solution.

In response, the claim 1, line 4, as presently written, recites the word “comprising”. The transitional term “comprising”, which is synonymous with “including”, “containing”, or “characterized by”, is inclusive or open-ended and does not excludes additional, unrecited elements or methods steps (MPEP § 2111.03)

The claims, as presently written, are open to the photocatalytic activity of newly, formed complexes.

CS '995 does not mention that any Fe-, Cu- or Ni-EDTA, N,N-methyldithiocarbamate, benzoate or phenol complex is formed. Thus, the objective evidence must be factually supported by an appropriate affidavit or declaration to be of a probative value (MPEP § 716.01(c)).

Applicants state that no hydroxyl radicals are mentioned in CS '995; and even no other radicals are related to. Therefore a person skilled in the art would not understand from CS '995, that the degradation of the complex-forming substances is caused by the action of free radicals, and especially not by hydroxyl radicals.

In response, the question is whether the method disclosed by CS '995 generates hydroxyl radicals. What is causing the degradation of the complex-forming substances does not distinguish the method steps of generating hydroxyl radicals from the prior art.

CS '995 teaches a reaction comprising phenol,  $Fe^{2+}$ , hydrogen peroxide ( $H_2O_2$ ),

oxygen (O<sub>2</sub>) and ultraviolet radiation (UV). Phenol was broken down (page 7, Example 7).

The Photo-Fenton reaction is  $\text{Fe}^{2+}/\text{H}_2\text{O}_2/\text{UV-VIS}$ .

It appears that CS '995 is a Photo-Fenton type reaction where hydroxyl radicals (OH•) would have been generated from the reaction:  $\text{Fe}^{2+} + \text{H}_2\text{O}_2 \rightarrow \text{Fe}^{3+} + \text{OH}^\bullet + \text{OH}^-$ .

Applicants state that an average person skilled in the art would not have combined any of the catalytic materials cited in US '903 with CS '995 as for example glass or quartz are known to be inert in photochemical reactions.

In response, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to EDNA WONG whose telephone number is (571) 272-1349. The examiner can normally be reached on Mon-Fri 7:30 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number

for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Edna Wong/  
Primary Examiner  
Art Unit 1795

EW  
August 21, 2008